

## **Encouragement of Emergent Design**

### **-Why can humans create?**

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Why can humans create? The “emergence” holds the key to solve this great mystery. Emergence was originally a word used to explain natural phenomenon, but in recent years, it has been acknowledged that such emergent phenomenon exists in human’s design process. This emergent design process holds the “mind to originate” and enables the generation of new ideas that did not exist before.

### **What is Emergence? -Learning from natural phenomenon**

Emergence exists in the system of nature. To describe this, the flock of birds is usually given as an example.

The birds inside a flock avoids nearby birds or obstacles. In addition, they adjust the speed and the direction of the flight to the other birds (flock). Furthermore, the birds try to fly towards the center of the flock. If such characteristic is established as a rule, by these rules, the birds nearby will affect each other. Then the affection is gradually transmitted through the nearby birds to the entire flock, resulting in the decision making of the movement of the flock (Figure 1.).

In other words, this phenomenon is expressed by the individual bird’s movement based on the rule, several birds “partially” interacts with others (local interaction between elements), resulting into the emergence of the “whole” flock’s movement (global order). Such characteristic to create the “whole” from the “partial” is called the “bottom up”, and is the key in emergent phenomenon (Figure 2.).

### **Existence of 2 designs -Emergent design and optimum design**

As a fact, this emergence process happens when an excellent designer designs something new and original, based on the "mind to originate". Such designing process is called as “emergent design”. This design is called the bottom-up design, which is a design that pays attention to the partial relations of the product characteristics or requirements at first, and then creates (idea) of the whole product’s system and function. In other words, the emergent design pays attention not to the whole, but only to the partial characteristics and requirements of the product from the beginning. This design differs from the

“optimum design”, which optimizes by repeated improvement.

Optimum design thoroughly examines an existing product under the “mind to pursue” and raises its completeness. As for this type of design, called the top-down design, analysis and evaluates the product characteristics based on existing products, then improves the system of the whole product and improves its function.

In design, these two types of designs exist, and each have a complementary relation to other. Generally, emergent design is used to think from a “part” in order to design something new. Thereby this emergent design, generates new concepts and creative idea as a “whole”. Then, the design gradually shifts toward the optimum design and accomplishes completion by refining the “part” based on the “whole” idea obtained by the emergent design (Figure 3.).

The precise interaction of these two designs is the key in realizing a creative and high-quality product. Therefore, in recent years, study on these designs are proceeded, and its essence has been gradually clarified.

### **Application of Emergent Design**

So far, “the existence of two types of design called the emergent design and the optimum design” has been stated. Then again, perhaps this fact has been unconsciously perceived to people associated in product development. It is thought that this kind of awareness is the most important perspective in the field of product development.

However, by focusing on the natural phenomenon called the emergent, and specifically showing the scheme of both designs, emergent design enables the application of the perspective to product development system. Therefore, it is considered that there is a significance in studying emergent design.

As stated before, the process of product design is gradually shifting from optimum design to emergent design. As a consequence, precise relation of the two designs generates a more unique and completed product. Therefore, various systems and know-how about the relation of design study are proposed and applied in product development of the company and design education of the university. For further information, see related books and documents.

## **Further Value Creation Using Emergent Design**

The manufacturing in Japan so far, has been assumed to be the optimum design. In fact, to improve products and raise completeness under the “mind to pursue” is one of the strength of Japan’s manufacturing.

However, I believe that there are more to Japan’s manufacturing. Under the “mind to originate”, Japan has produced many innovative products. Moreover, product developments such as these, will be strongly expected from now on.

As stated in the beginning, the precise answer to “why humans can create?” has not yet been given in the former design study. However, the awareness of emergence led to an expansion, and the concept of emergence and its mechanism guided design science to a big leap. As a result, the essence of the interesting act called “designing”, which designers undergo to create new products, has been gradually clarified.

If the essence of “designing” is cleared, can construct an effective development system which can adapt to individual company’s development environments and design development of the designer. Thereby, the expansion of a new product development for new value creation can be expected. Thus, emergent design can be understood as an important hint to realize a new product development that can create new value.

Figure 1. Emergent phenomenon seen in bird flocks

Figure 2. Concept of emergence

Figure 3. From emergent design to optimum design